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# NASA Nebraska Space Grant Consortium 1995-1999 Self Evaluation

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et al.

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Et al. The entire membership of the NASA Nebraska Space Grant Advisory Board.

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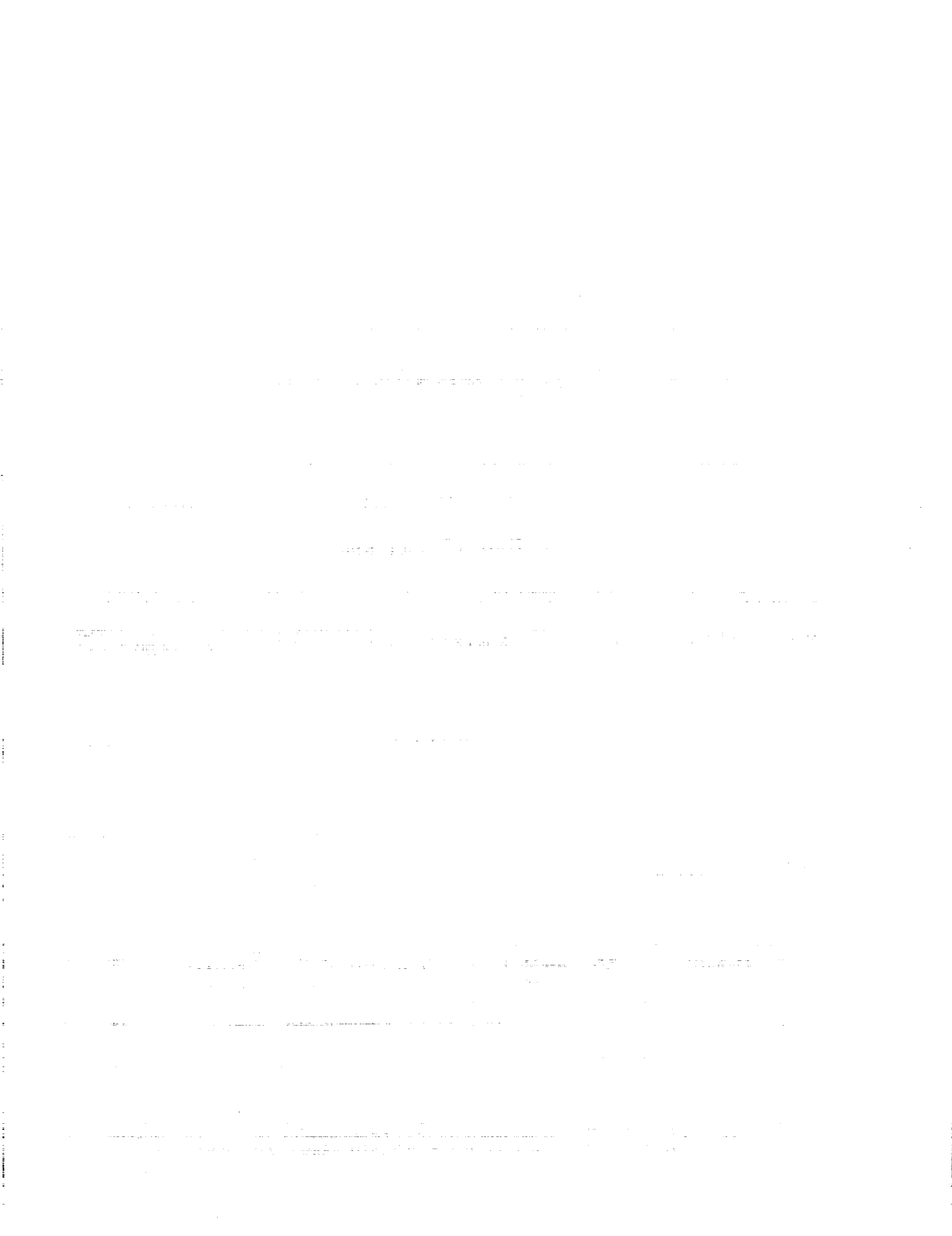
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**NASA Nebraska Space Grant Consortium**  
**1995-1999 Self-Evaluation**  
**Submitted to NASA December 1998**



**Program Summary**

- The NASA Nebraska Space Grant Consortium receives funds from NASA to allow Nebraska colleges and universities to implement balanced programs of research, education, and public service related to aeronautics, space science, and technology.
- Nebraska is a capability enhancement state which directs efforts and resources toward developing research infrastructure and enhancing the quality of aerospace research and education for all Nebraskans.
- Furthermore, the Nebraska Space Grant strives to provide national leadership in applied aspects of aeronautics.
- Nebraska has met, meets, and will continue to meet all requirements set forth by NASA.
- Nebraska is a top-tier consortium and will continue to be a model program.

**Executive Summary**

The first self-evaluation in 1994 resulted in the identification of areas needing improvement within the Nebraska Space Grant. The self-evaluation also strengthened the Nebraska Consortium through improving communication and implementing strategic planning practices. It is hoped that this second self-evaluation will be as useful in directing the consortium's flight plan into the next century.

The qualitative and quantitative review of past performance by the advisory board, past and present participants, local program management, two external evaluators, and all constituents contributed to this collaboratively written consortium report. Another strategy in self-evaluation of the Nebraska Space Grant Consortium entailed visiting other consortia to exchange ideas and work towards the constant improvement in programs and administration of the Nebraska Space Grant.

Additionally, the NASA Nebraska Space Grant conducted a focus group composed of advisory board members to allow diverse feedback from different aspects of the program. This focus group ranked strengths and weaknesses of the Nebraska Space Grant, followed by a structured discussion of strategies to raise the weak areas to the same level of performance as the strengths.

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### Background

The NASA Nebraska Space Grant Consortium did not become a model program overnight. Nebraska was one of the last states to join the National Space Grant College and Fellowship Program. Since 1991, Nebraska has made great strides to reach the top tier. Some of these strides include meeting each of the self-evaluation criteria set forth in a challenge by Dan Goldin, leadership at the national level of the Space Grant program, and a NASA EPSCoR grant which has grown from successful Space Grant research. Now that Nebraska is at the top tier, the consortium will work to maintain its status as a model program.

On August 31, 1989, NASA announced the first 17 designated Space Grant consortia under the National Space Grant College and Fellowship Program, mandated by Congress in 1987 (Public Law 100-147). This number later grew to 21 original consortia. Then NASA Administrator Richard H. Truly stated, "The National Space Grant College and Fellowship Program will help maintain America's leadership in aerospace research, training and education."

While Nebraska did not compete during this first phase, the Phase II announcement was made on May 9, 1990. Each state not yet participating in the Space Grant program was allowed one proposal in either the Program Grant or the Capability Enhancement Grant competition. Letters of intent were due to NASA on June 29, 1990, and complete proposals were due October 29, 1990, yet no one from Nebraska submitted a proposal during this round either. Since Nebraska was not yet involved in the developing national program, in the Spring of 1991, the University of Nebraska at Omaha's (UNO) Aviation Institute submitted an initial planning grant proposal to develop the Nebraska Space Grant Consortium under Phase II.

Using the planning grant, UNO developed and submitted its successful Capability Enhancement proposal. The Capability Enhancement Grants were designed for those states wishing to develop the aerospace research infrastructure in the state to competitive levels. The Capability Enhancement Grant was awarded to Nebraska for \$150,000 annually for a four-year period.

This grant led to the creation of the Nebraska Space Grant Consortium with the following goals:

- To clearly establish statewide goals concerning development of interdisciplinary education, research infrastructure, and public service programs related to aeronautics, space science, and technology.
- To recruit and train professionals, especially women, underrepresented minorities, and persons with disabilities, for careers in aeronautics, space-related science, and engineering.
- To develop a strong science, mathematics, and technology education base from elementary through university levels.
- To develop an aerospace research infrastructure within the state of Nebraska.

The first self-evaluation in 1994 resulted in the identification of consortium areas needing improvement. The self-evaluation also strengthened the consortium through improving communication and implementing strategic planning practices. This self-evaluation was the first nationally mandated five-year evaluation, and covered the time period from 1989 through 1994 (although the Nebraska Space Grant did not commence until 1991). This second five-year evaluation will only review progress and performance from 1995 through 1999.

This self-evaluation should include, but is not limited to, the following guidelines suggested by NASA program management.

- Fair distribution and timely costing of consortium funds
- Fair distribution of student awards for member institutions
- Diversity results
- Evidence of interdisciplinary projects, courses, etc.
- Evidence of effort to communicate and establish working relationships with NASA Centers
- Evidence of fair distribution of consortium funds to member institutions
- Evidence of fair competition for funding
- Evidence of fair grievance resolution among member institutions
- Evidence of sound fiscal responsibility including timely costing, unliquidated obligations, and timely submission of Federal Cash Transaction Report Standard Form 272-A
- Evidence of annual meetings with all affiliates to discuss consortium and plan for growth
- Annual conference for students, faculty, administrators to communicate results, share ideas, etc.

The NASA Nebraska Space Grant Consortium is housed at UNO's Aviation Institute. As UNO is the administrative home for the program, it is also the lead institution for the consortium. Aviation Institute Director, Dr. Brent D. Bowen, serves as the Consortium Director for Nebraska. Nebraska belongs to the Space Grant Western Region and has been active in regional meetings. Additionally, Dr. Bowen serves on the Executive Committee of the National Council of Space Grant Directors, and serves as Co-Chair of the Aero-Space Working Group of the Council.

The National Space Grant College and Fellowship Program maintains a presence in each state, the District of Columbia, and Puerto Rico through a consortium in each state. These consortia represent NASA in their respective states and territories. Because of this important network of universities, industry, and government, NASA has maintained visibility throughout the country. At the spring directors' meetings held in Washington, D. C., the Nebraska Space Grant representatives provide briefings to the Nebraska Congressional delegation and/or their key staff advisors. These briefings and periodic updates to the congressmen have resulted in support for increased Space Grant funding in Congress. In fact, two of the three Nebraska congressmen signed a letter of support for Space Grant in 1998. Additionally, Nebraska Senator Bob Kerrey and NASA Administrator Dan Goldin attended a Nebraska Space Grant briefing on the UNO campus in August 1997. This briefing centered on the collaborations between the UNO College of Education and the NASA Nebraska Space Grant.

### Program Description

The NASA Nebraska Space Grant Consortium is made up of four main program components: fellowships, research infrastructure, education, and public service. These components are further divided into subcategories described in the findings section. The NASA Nebraska Space Grant Consortium uses the utilitarian approach where the resources are directed toward the greatest good for the greatest number. Since the Consortium's creation, faculty and students from the following affiliate colleges and universities have taken part in the program:

- |   |   |
|---|---|
| • University of Nebraska at Omaha, Lead Institution | • Metropolitan Community College        |
| • Chadron State College                             | • Nebraska Indian Community College     |
| • College of St. Mary                               | (2 campuses)                            |
| • Creighton University                              | • University of Nebraska-Lincoln        |
| • Grace University                                  | • University of Nebraska at Kearney     |
| • Hastings College                                  | • University of Nebraska Medical Center |
| • Little Priest Tribal College                      | • Western Nebraska Community College    |

The NASA Nebraska Space Grant serves faculty and students at participating Nebraska colleges and universities, the general public, users of the Nebraska library system, industry, farmers, journal subscribers, monograph authors and users, K-12 teachers and students, and reservation and tribal college students, among others.

Program stakeholders include diverse groups such as funded researchers, present and past; potential researchers; advisory board members; UNO Aviation Institute faculty and staff; NASA program management; funded scholars, present and past; potential scholars; and the taxpayers.

Features unique to Nebraska must be considered in evaluating a national program such as the Space Grant. For example, the limited aerospace industry in Nebraska and the geographic distance for affiliate communication are two key factors. The geographical constraints of Nebraska mean that some affiliates will be less active than others simply due to distance. Additionally, external forces which have impacted the program since 1995 include the federal budget crisis which caused late funding in 1996, the Space Grant budget augmentation which caused late funding in 1997, and partial/incremental funding in 1998.

### **Mission**

Nebraska is a capability enhancement state awarded funds to develop research infrastructure and enhance the quality of aerospace research and education throughout the state. Furthermore, the NASA Nebraska Space Grant and EPSCoR programs strive to provide national leadership in applied aspects of aeronautics.

- Objective:** To improve the participation of academic affiliates, thereby increasing the visibility of the Nebraska Space Grant Consortium and promoting opportunities throughout the state.
- Objective:** To promote increased aerospace and aeronautics opportunities among participating state and private post-secondary institutions through providing student research opportunities with appropriate faculty mentorship.
- Objective:** To increase Nebraska's position in the aeronautics and aerospace industry.
- Objective:** To recruit and train underrepresented minorities in Nebraska for careers in the aeronautics and aerospace fields.
- Objective:** To increase ties with NASA Strategic Enterprises and Centers.

### **Purpose**

Every five years a comprehensive evaluation of each state's Space Grant is required by public law. According to the Federal Register, Vol. 54, No. 47, Subpart 4, "Designation of Space Grant . . . consortia . . . shall be for five years. Designation of Space Grant colleges and consortia may be continued based on a merit review at the beginning of the fifth year." The national program began in 1989, and the first evaluation took place in 1994. The next five-year evaluation is scheduled for 1999. Towards this end, the NASA Nebraska Space Grant Consortium is complying with NASA's request to conduct a self-evaluation of performance from 1995-1999 and submit the report to NASA no later than December 31, 1998.

Primarily, the evaluation is being conducted for the National Space Grant Program staff at NASA Headquarters. This formal, formative evaluation facilitates ongoing, program improvement. Therefore, it follows that five-year renewals for Space Grant will be determined based on the outcomes of the evaluation. This internal self-evaluation is only one component of the evaluation process. Other components are described in the methodology section.

The self-evaluation component of the program evaluation also establishes better communication among the members of the Nebraska Space Grant in terms of strategic planning. The advisory board is utilizing the evaluation process and results to determine courses of action for the future growth and direction of the NASA Nebraska Space Grant.

An effective program evaluation at this stage of the Nebraska Space Grant assists in assessing the merit of the program to date and determining future courses of action. The advisory board, composed of representatives of aeronautics and aerospace fields, provides valuable feedback as to the performance and progress to date. The evaluation also ensures the program is accountable in terms of quality and direction to the stakeholders, including educators, students, researchers, and taxpayers, among others.

Through the use of structured application forms for seed research, education outreach, and travel grants, the Nebraska Space Grant assures the program goals are outlined for program applicants and thus met through the activities. The advisory board's grant review committee evaluates these proposals and bases its review on the ability of programs to meet many of the program goals. If it is evident the application does not meet minimum program goals (i.e. applicability to NASA), the proposal is not forwarded to the advisory board; rather, it is returned to the applicant outlining areas for improvement.

This five-year self-evaluation will determine renewals for each individual Space Grant consortium. The announcement for renewals is tentatively scheduled for October of 1999.

### **Evaluation Questions**

This evaluation covers a broad range of questions related to both the administrative and programmatic success of the NASA Nebraska Space Grant Consortium. Specifically, the evaluation addresses the following questions:

- Are the funds fairly distributed?
- Are NASA Nebraska Space Grant policies and procedures logical and effective?
- Are NASA goals reflected in the program outcomes?
- Is the Nebraska Space Grant responsive to NASA and to program participants?

### **Methodology**

The five-year evaluation required by the National Space Grant College and Fellowship Act is composed of several elements. These elements and their respective scores are provided as NASA defines them:

- A collaboratively-written comprehensive self-evaluation, agreed upon by all affiliate members of the consortium, not to exceed 20 pages in total length (50%),
- A comprehensive quantitative analysis of consortium data using the Consortium Management Information System (CMIS) (30%), and
- An account of consortium responsiveness to Headquarters and Field Center requests for information and assistance (20%).

The CMIS data referred to above is the annual reporting mechanism used by Space Grant consortia. This reporting was completed by deadline in March 1998 for the 1997 year. The element of responsiveness to NASA cannot be controlled in the self-evaluation process. Program management will objectively and subjectively score consortia on past performance in this area. Nebraska always meets NASA deadlines and responds to requests for information and input.

Therefore, the written self-evaluation is the only element which needs to be addressed. In order to review the performance of the Nebraska Space Grant, the evaluation is composed of invited input and questions from all constituents for the advisory board to address; feedback from a focus group of advisory board members, including academic affiliates; document reviews of CMIS data and quarterly reports, both qualitative and quantitative; and a survey of all researchers, past and present, about the seed research program.

### **Sample, Data Collection, and Instrumentation**

Both quantitative and qualitative data are included in this self-evaluation. Quantitative results come from a survey of faculty researchers, developed using survey research methods and pilot-tested by ten individuals; annual report data from the Consortium Management Information System (CMIS); annual budgets; quarterly reports from funded participants; and other documents in the files of the NASA Nebraska Space Grant Consortium. Qualitative sources include follow-up interviews of faculty researchers, feedback from an advisory board focus group, and interviews with student fellows and outreach participants. Additionally, all Nebraska Space Grant constituents were provided the opportunity via the statewide listserv to comment and pose questions for the Advisory Board to address at the focus group meeting which centered on the self-evaluation.

One final source of data is an exercise the Advisory Board members completed at the focus group meeting. This exercise consisted of ranking the 43 self-evaluation criteria which define positive consortium qualities to determine Nebraska Consortium strengths and weaknesses.

### **Data Analysis**

The collected advisory board and interview data were implemented using content analysis. Trends, patterns, and consensuses were sought to highlight important ideas from the board. The seed research survey data were analyzed using Corel Quattro Pro, while the CMIS data were analyzed by identifying performance gaps and performance successes through both quantitative and qualitative means. Additionally, two external, independent evaluations were conducted of the self-evaluation. These evaluators concurred with the process and results contained herein.

### **Findings of the NASA Nebraska Space Grant Consortium**

The findings of the evaluation are provided in the following order: Overview/Structure, Management, Fellowships, Research Infrastructure, Education Outreach: Higher Education and K-12, and Public Service.

#### **Overview and Structure**

The NASA Nebraska Space Grant Consortium was established in 1992 with only four academic affiliates. The program has effectively increased in scope over the past seven years by including additional affiliate institutions from across the state. In 1994, the five academic affiliates represented the five largest universities in the state. Today, the thirteen academic affiliates include community colleges, institutions serving women and minority groups, and smaller four-year schools from rural Nebraska. Table 1 illustrates the increased numbers of Nebraska affiliates, including government, non-profit, and industry affiliates.

Table 1. Academic affiliates of the NASA Nebraska Space Grant

	1994	1995	1997
Number of academic affiliates	5	10	13
Total number of affiliates	5	10	21

The NASA Nebraska Space Grant has increased the number of programs from 44 in 1995 to 78 in 1997. This increase is due to the motto of 'doing more with less.' The NASA Nebraska Space Grant is operating efficiently by supporting more programs on a smaller scale that have proven their effectiveness.

The increase in funding from 1995 through the present represents the work of the NASA Nebraska Space Grant to seek additional opportunities for improving Nebraska programs (see Table 2). First of all, the affiliate structure award allowed the Nebraska Space Grant to include additional colleges and universities which have fewer resources. Director Brent Bowen learned of the affiliate award in 1995 and actively pursued the opportunity to expand the Nebraska Space Grant Consortium.

The affiliate award is a \$35,000 permanent augmentation for Space Grant consortia with ten or more academic affiliates. The additional affiliates added to the Nebraska Space Grant include both Nebraska tribal colleges, an all-women's college, and several community and rural colleges with great student potential. The addition of these affiliates creates a more diverse network of colleges and universities which will benefit the citizens of Nebraska by offering more opportunities statewide.

Table 2. Total funding for NASA Nebraska Space Grant

Source of Funds	1995	1996	1997	1998	1999 (proposed)
NASA	\$185,000.00	\$221,000.00	\$220,000.00	\$271,250.00	\$271,250.00
Match	\$234,070.00	\$145,470.00 estimate	\$254,413.00	\$156,928.00 to date	\$197,531.00 proposed

The budget augmentation in 1998 and 1999 consists of an increase from Congress to support the National Space Grant College and Fellowship Program. The augmentation is considered a cost of living increase for Nebraska in that most program areas received increased funding. U.S. Congressmen from Nebraska were supportive of the increased funding. In fact, two of the three Nebraska Representatives signed a support letter originated from Congressman Stabenow (MI), and one of the two Nebraska Senators met with NASA Administrator Daniel Goldin on his visit to Omaha in 1997. During this visit, Senator Bob Kerrey and Dan Goldin toured the Space Grant-sponsored Space Shuttle Maverick and were briefed on collaborative efforts between Space Grant, the UNO College of Education, and the Nebraska school districts.

Collaborations with various groups have resulted in significant increases from 1995 to 1997 (see Table 3). Following NASA's request to increase collaborations and networks with NASA field centers, Nebraska's collaborations in this area increased almost 400 percent. Similar results can



be seen in collaborations with underrepresented organizations and total collaborative efforts. However, the slight increase in industry collaborations is an area which will be targeted for improvement during the next century.

Table 3. Collaborative efforts of the NASA Nebraska Space Grant

	1995	1997
Collaborative efforts with industry	17	19
Collaborative efforts with underrepresented organizations	9	35
Collaborative efforts with NASA Centers	4	27
Total collaborative efforts	155	405

The mission and objectives of the NASA Nebraska Space Grant Consortium are aligned with the national program. This is evidenced through the 43 self-evaluation criteria set by NASA in a challenge from Administrator Dan Goldin. When the challenge was presented in 1996, Nebraska endeavored immediately to meet each of these guidelines. While some of the criteria to date are optional, Nebraska was able to personally present a report card to Dan Goldin during his visit to the Nebraska Space Grant in 1997. This report card illustrated to Mr. Goldin and his advisors that the Nebraska Space Grant Consortium met every guideline presented in the challenge. Nebraska met every guideline again in 1998.

One of the goals of the original Space Grant legislation is to recruit and train professionals for the aerospace industry with an emphasis on underrepresented students. Nebraska continues to make strides in this area with a new underrepresented focus of the Nebraska Space Grant. This is not a new program, rather it is an effort which aims to include underrepresented groups in all aspects of the Nebraska Space Grant Consortium to further the capabilities of all Nebraskans. The effects of this effort are illustrated through the increased number of Space Grant programs which target underrepresented groups. The number of such programs grew from 14 in 1995 to 37 in 1997.

The Nebraska Space Grant Underrepresented Scholarship recruits students to attend UNO and local community colleges where they are provided with role models and mentors to assist them in their academic pursuits. High schools and community colleges assist in identifying underrepresented students with great potential to succeed in science-related careers, but lack the resources to do so. Teacher training in the UNO College of Education Space Shuttle *Maverick* Simulator is taking place with underrepresented schools through the Banneker Program. Students and teachers alike are learning about the Earth, space, and NASA's mission through the program. A proposal workshop encouraged proposals from faculty of the two Nebraska Indian reservations, both tribal colleges and K-12 school districts. The previous lack of submissions by these individuals was identified as a barrier to their inclusion in funded Space Grant programs. The results of the proposal seminar include three funded proposals from the two reservations: one seed research, one travel grant, and one education outreach grant.

## Management

Two years ago, the NASA Nebraska Space Grant Consortium moved to an advisory board composed of one campus coordinator at each academic affiliate, representatives from government and industry, and the management team of the NASA Nebraska Space Grant Consortium and EPSCoR Programs. Membership on this advisory board assures representativeness of diverse input for Nebraska. Additionally, the board consists of representatives from Land Grant and Cooperative Extensions in the state. Each affiliate is allowed one vote.

The Director of the Nebraska Space Grant Consortium is responsible for the implementation of policies developed by himself and the advisory board. The director ensures the policies are carried out on each campus through communication with the Campus Coordinators and placing specific policy provisions in subcontracts.

### Annual Affiliate Meeting to Discuss Consortium and Plan for Growth

During the review period, the statewide Nebraska Space Grant Consortium Advisory Board convened on the dates below:

- |                    |                     |
|--------------------|---------------------|
| • April 28, 1995   | • April 25, 1997    |
| • April 26, 1996   | • October 31, 1997  |
| • December 6, 1996 | • November 13, 1998 |

The advisory board meets at least one time per year. In 1996 and 1997, the Nebraska Space Grant attempted two statewide advisory board meetings per year. The spring meeting was held in conjunction with the NASA Nebraska Space Grant Consortium research conference at the Nebraska Academy of Sciences in Lincoln. The fall meeting was held at Mahoney State Park, the mid-point between Omaha and Lincoln. Due to decreased attendance at each meeting the spring meeting was eliminated; however, all advisory board members are encouraged to attend the spring research conference to learn about the program's outcomes.

The NASA Nebraska Space Grant Consortium Strategic Plan was developed in February 1996. This self-evaluation process also facilitated a comprehensive strategic planning component which resulted in a revised strategic plan to direct the Consortium into the next century.

### Fair Grievance Resolution Procedures among Member Institutions

To date, problems have been few regarding management of the NASA Nebraska Space Grant Consortium. Grievance procedures were adopted in 1996 and no academic affiliates have been dropped from the program to date. However, should an academic affiliate fail to meet the obligations set forth in their subcontract, the status of the affiliate would be reviewed by either the director or the advisory board and resulting action could range from reduced to eliminated funding in future years.

### Fair Distribution and Timely Costing of Consortium Funds

The NASA Nebraska Space Grant Consortium holds an annual statewide competition for research infrastructure, education outreach, and fellowship funds which is open to all member institutions. A committee of the advisory board reviews and recommends proposals to the entire advisory board for approval. This competition is in addition to the travel grant program, the base fellowship and scholarship funds for each institution, and the senior research funding. Those

applications which are selected receive subcontract guidelines with specific dates for funds to be expended. This is in keeping with NASA's recent request for timely costing of consortium funds. As this request is recent, future subcontracts not expended on time will not, as it states in the subcontract, be reimbursed.

Recruiting new academic affiliates is an ongoing process as stated in the objectives of the Nebraska Space Grant Consortium. The first step in the recruitment of a new academic affiliate involves reviewing the academic offerings of the school. Many institutions in the state of Nebraska have science programs that need to be further developed. It is up to the director to evaluate how the Nebraska Space Grant Consortium could fulfill this role. Next, the school is contacted and a meeting is scheduled to determine if there is interest on the part of school. An overview of the Nebraska Space Grant program and the National Space Grant College and Fellowship Program are presented at this time. A final step before making the decision entails an evaluation of the demographics the school serves. In the past, institutions serving underrepresented minorities have been given priority.

**Evidence of Sound Fiscal Responsibility Including Timely Costing, Unliquidated Obligations, and Timely Submission of Federal Cash Transaction Report Standard Form 272-a**

Nebraska has followed through on the recent request by NASA Headquarters to ensure the timely costing of NASA funds. This is being accomplished through several means. First, a meeting with the Grants Accounting Manager at UNO, the Lead Institution, confirmed the 272 forms are being filed electronically from the State of Nebraska Accounting Office in Lincoln to NASA. Thus, there are no physical forms which can be traced. Second, the time constraints provided in each subcontract specify dates for reimbursement which allow for the grant to be costed in a timely manner. It should be noted that late funding from NASA, both Space Grant and EPSCoR the past two years has impacted the timely costing of funds, but the Nebraska Space Grant continues to resolve this issue through proper channels in the state.

Management expenses have remained stable with the slight increase in funds, but decrease in percentage, reflected in 1997 from the augmentation. Management at NASA Headquarters encouraged Space Grant consortia to consider increasing management expenses to reflect cost of living increases. This slight increase in 1997 was directed toward more resources in distance education, a new focus of NASA's Education Roadmap.

In the last self-evaluation, NASA considered low management expenses to be less than 10 percent of the grant budget and high management expenses to be more than 35 percent of the budget. Nebraska's management expenses in terms of percent of the grant are included in Table 4. Due to the increased budget in 1997, the slight increase in management expenses, as suggested by NASA Space Grant program management, remains appropriate for the Nebraska Space Grant. Table 4 also indicates the percent decrease in management expenses from 1995 to 1997 for the Nebraska Space Grant.

Table 4. Management Expenses of the NASA Nebraska Space Grant

	1995	1997
NASA funds directed toward management	\$52,587.00	\$57,543.00
Percent of management costs	28.4%	21.2%

### Visibility

Increased visibility of the NASA Nebraska Space Grant is accomplished through media coverage and press releases to aerospace/aeronautics publications, local media, and campus media. The best results have been announced through university media personnel, such as the Airline Quality Rating. Media experts estimate more than 50 million people see this study each year.

Further publicity is accomplished through the implementation of our Nebraska Space Grant marketing plan, which has been developed specifically for the Nebraska Space Grant Consortium and is implemented by a marketing intern. This plan allows the Space Grant to more efficiently implement marketing strategies for better visibility and awareness of the program. This plan utilizes a campus identity strategy to become more visible on each affiliated campus. It includes contact with campus operator and mail rooms about our location and extension, flyers at campus information and alumni centers, listings in campus phone books, and a description in the graduate and undergraduate catalogs/bulletins.

The primary means of publicity for the Nebraska Space Grant Consortium is through the homepage on the World Wide Web and the listserv for all those interested in the NASA Nebraska Space Grant. Web site hits for the past year exceed 5,000 and are expected to increase as all applications for fellowships, seed research, travel grants, and education outreach are now on-line. Nebraska is endeavoring to meet the newly-established web page guidelines during January 1999.

The listserv allows opportunities for funding to be disseminated statewide in a timely fashion. It also provides an efficient means of communication with all constituents. Those receiving funding from the NASA Nebraska Space Grant are required to subscribe to the listserv. The grant coordinator disseminates Space Grant and EPSCoR e-mail at the rate of 6 per month.

### Fellowships

Student involvement in research through fellowships is a primary component of the Nebraska Space Grant. As seen in Table 5, the number of fellowships has increased from 1995 to 1997. More importantly, the number of fellowship applications has increased to almost 200.

Table 5. Fellowships from the NASA Nebraska Space Grant

	1995	1997
Amount of fellowships awarded	\$76,575.00	\$112,698.00
Applicants	56	193
Awards	37	53
Percentage of awards to underrepresented groups	8%	15.1%

### **Fair Distribution of Student Awards for Member Institutions**

Each institution receives base funding for scholarships and/or fellowships based on past performance. For example, those institutions which do not expend their fellowship funds, do not submit required reports, and/or do not meet subcontract guidelines (i.e. attempt to attract underrepresented students) will receive reduced funding in subsequent years. However, those institutions which excel in these same areas will receive an increase in their budgets for subsequent years. Above the base amounts for funding, a statewide competition for research funding, including research fellowships and scholarships, is held annually in which all participating institutions may compete.

Scholarships and fellowships are promoted through several mechanisms statewide. First of all, traditional means of advertising on participating campuses includes posting flyers, brochures to each department, departmental newsletters, class announcements, and the campus newspaper. Additionally, the Space Grant office updates the web site with deadlines, applications, and a frequently asked questions (FAQ) page; sends messages to the listserv so all parties interested in the Nebraska Space Grant are aware of the deadlines and are asked to share with colleagues and classes; sends mailings to previous successful and unsuccessful applicants; and presents opportunities at department and college meetings.

The fellowship recipients are selected by a competitive process that begins with the student application submitted to the designated consortium Campus Coordinator on their respective campus. Each participating institution uses a committee of selected faculty and administrators to choose among the applicants. The number of fellowships awarded by each institution are based on the number of aerospace research opportunities and projects that are available in which students may participate and on the institution's past consortium performance. Preference is given to those students with research components on their application. These fellowships and scholarships allow students to participate in a wide range of aerospace education and research activities, including the Goddard and Marshall NASA Academies.

### **Annual Conference to Communicate Results**

As student fellows and scholars are encouraged to participate in research with a faculty mentor, they are also required to present their findings at the Annual Nebraska Space Grant Research Conference, held in conjunction with the Nebraska Academy of Sciences in Lincoln each year. The faculty mentor assists the student in preparing for the conference. Abstracts are published in the Proceedings of the Nebraska Academy of Sciences. This conference allows students to experience presenting a professional paper; the advisory board members the opportunity to see research outcomes of the program; and faculty to collaborate further on research. Additionally, holding the conference in conjunction with the Nebraska Academy of Sciences allows the Nebraska Space Grant to publicize the research results to a greater audience.

### **Diversity Results**

In addition to the increase in number of fellowship applications and the number of fellowships being awarded, the percentage of awards to minority students has nearly doubled from 1995 to 1997 (see Table 5). The 15.1 percent of fellowships which were awarded to underrepresented students in 1997 needs further clarification. According to the *Chronicle of Higher Education Almanac* (August 29, 1997), the proportion of college students who are minority-group members

in the fall of 1995 in Nebraska equals 8 percent. This figure includes non-U.S. citizens, while our fellowships are restricted to U.S. citizens. Therefore, the 8 percent of fellowships Nebraska awarded in 1995 is equal to the percentage of underrepresented students in the state. Furthermore, the increase to 15.1 percent in 1997 illustrates that Nebraska is not only meeting, but exceeding our share to assist underrepresented students in the nation.

Additional efforts in the area of diversity include curriculum development funding for a Diversity in Aviation and Aerospace course which examines roles and contributions minorities have made to the fields, funding a specialist in the area of underrepresented minorities to further relations with the tribal colleges and reservation school districts, and a component of the NASA EPSCoR grant devoted to underrepresented involvement in aerospace and aeronautics research and education.

### **Research Infrastructure Programs**

Faculty are provided the opportunity for research enhancement funds which encourage conference attendance, research initiation, enhancement of teaching activities, and mentorship of fellows in research projects. Additionally, developing interdisciplinary research infrastructure and enhancing Nebraska's capabilities are target areas.

### **Fair Competition for Funding**

As stated previously, the Nebraska Space Grant holds an annual statewide competition for research funding. All participating institutions are eligible to compete and information is mailed to each department. The application process has been streamlined to include applications on the web site with goals and priorities of NASA provided. These applications / proposals are due each fall before the annual advisory board meeting. A grant review committee composed of advisory board members then makes a recommendation to the entire board for approval.

### **Fair Distribution of Consortium Funds to Member Institutions**

Distribution of funds to institutions with little or few research resources are given special consideration in the review. For example, the Nebraska Indian Community College submitted a proposal similar to the one submitted by the College of Saint Mary for weather stations which would be used for research data collection. As both proposals involved students in research, and neither institution had received research enhancement funds prior, the review committee recommended funding both proposals, subject to revisions suggested by the committee. One of the recommendations was for the two institutions to collaborate on the project. The recommendations were well received and a new research collaboration between two underrepresented serving institutions has developed as a result.

One obstacle to broader distribution which has been identified by the advisory board's review committee is the inability to recruit successful proposals from a new pool of applicants. Strategies to address this weakness include more presentations at department and college levels, more personal contact with institutions outside of the Omaha and Lincoln areas, and more visibility on each campus through the marketing implementation plan. Additionally, the advisory board recommended providing unsuccessful applicants with constructive criticism for re-submission of their proposal.

### **Communicate and Establish Working Relationships with NASA Centers**

Collaborations with NASA Centers is a priority for Space Grant and EPSCoR funding. To meet this goal, researchers are required to submit quarterly reports in which they share the progress of their research. Some of the NASA collaborations are cited below.

HQ, Dr. Ming Wei	JPL, Kobie Boykins	Dryden, Lee Duke
HQ, Dr. Alexander Tuyaho	JPL, Yolanda Oliver	Langley, Dr. Shelley Canright
HQ, Dr. Philip Sakimoto	Ames, Liza Alderette	Langley, Jeff Seaton
HQ, Debbie Gallaway	Ames, Geoff Lee	Langley, J. Comstock
HQ, Jenny Kishiyama	Ames, Tom Clause	Lewis, Dr. Frank Montegani
Stennis, Dr. Bruce Davis	Ames, Mike Shafto	Lewis, William Nyerges
Goddard, Mr. Terry Garegnari	Ames, Key Dismukes	Lewis, Daniel L. Dietrich
Goddard, Dr. Gerry Soffen	Ames, Dr. Judith Orasanu	Johnson, Dr. Bob Fitzmaurice
JPL, Dr. Dave Nichol	Dryden, Joseph Coburn	Johnson, Dr. Lak Putcha
JPL, Carol Hix	Dryden, Kajal Gupta	Johnson, Charles Anderson

Many activities are conducted with NASA Field Centers and other NASA programs. Some of these activities include CASDE and KidSat in association with JPL; ARC in association with Stennis; CALMIT is Regional Application Center equipped to receive SeaWiFS; CALMIT received grant for "An Initiative to Create an Environmental Monitoring Laboratory at the UN-L" through Code Y; NASA Academy at Goddard, Marshall, and Dryden; EROS Data Center; Aeronautics Education Coordinating Committee; Space Grant Aeronautics/Aero-Space Working Group leadership; sponsor NASA articles in the Journal of Air Transportation World Wide; funding a SHARP Alum's research enhancement project; and a team application from the Nebraska tribal schools for the 1999 NOVA program at NASA Ames; among others.

### **Annual Conference to Communicate Results**

All faculty researchers or their student fellows are required to present at the Annual Nebraska Space Grant Consortium Research Conference held each year in conjunction with the Nebraska Academy of Sciences Annual Meeting.

### **Industry Ties**

Developing collaborations with industry was a weakness cited in the last self-evaluation due to the lack of a viable aerospace industry in Nebraska. In addressing this problem at the recent advisory board meeting, the board recommended several industry ties and directions to pursue with regard to industry collaborations. However, the consortium is collaborating with the Nebraska Department of Aeronautics and the Nebraska Aviation Council, a group composed of Nebraska aviation industry representatives on several projects. While the Nebraska Space Grant still struggles with this initiative due to few resources, progress is being made in this area since receiving the NASA EPSCoR grant and in light of the new feedback from the advisory board.

The relationships with state government have resulted in even greater successes than private industry. Through the Nebraska Department of Aeronautics (NDA), education and outreach initiatives such as the Edgerton Aviation Museum Project and the support of state government have been advantageous to the Nebraska Space Grant. In fact, the Edgerton Museum Project, a joint project with the NDA, won the national Aviation Education award from the National Association of State Aviation Officials.

### Other Success Indicators

Success of the Nebraska Space Grant Consortium is also measured by the number of publications, presentations, and proposals generated by Space Grant; other scholarly work such as monographs, contributions to further research, and the overall contribution to the aerospace industry; and the attainment of self-evaluation guidelines from the Goldin challenge. Table 6 highlights some important increases in research infrastructure.

Table 6. Research Infrastructure Programs of the NASA Nebraska Space Grant

	1995	1997
Research infrastructure programs	15	19
Participants	5,002,994	50,000,000*
NASA funds	\$38,868.00	\$35,233.00
Matching funds	\$72,990.00	\$102,265.00
Resulting proposals submitted	16	27
Resulting proposals funded	10	18 (as of 3/31/97)
Total amount won via proposals	\$8,201,500.00	\$874,050.00 (as of 3/31/97)
Publications	see CMIS	100
Peer-reviewed publications	see CMIS	74

\*includes national media coverage

One Nebraska success story illustrates the results when cooperative programs among universities; aerospace industry; and federal, state, and local governments pool resources to benefit the state's economic development. A joint project on remote sensing between the University of Nebraska - Lincoln, the University of Nebraska at Omaha, and Creighton University encourages interdisciplinary and inter-institution cooperation, therefore enhancing the research infrastructure of Nebraska. As a result of this cooperation, the involved Space Grant faculty successfully wrote a cluster proposal and won a NASA EPSCoR research grant. It is still too early to predict the long-term economic impact on the state; however, the initial effect of this type of research funding in Nebraska has led to other funded research proposals, such as the NASA Stennis-funded Affiliated Research Center at UN-L; and faculty student, and curriculum development.

Enhancement of the library holdings is a priority for the Nebraska Space Grant. This support of the library ensures students and faculty have appropriate resources for research and curriculum development. In 1998, the Nebraska Space Grant examined the number of volumes available statewide through the inter-library loan from the University of Nebraska at Omaha. Aeronautics resources alone totaled 9,574 volumes at UNO.



## Education Outreach Programs

### Fair Competition for Funding

The review committee of the advisory board considers education outreach proposals in the same fashion as research proposals. This ensures equity among affiliates; each allowed only one vote.

### Interdisciplinary Projects, Courses, Etc.

The NASA Nebraska Space Grant Consortium promotes a strong science, mathematics and technology base from elementary through university levels. Some of the education activities and programs associated with the Nebraska Space Grant Consortium include engineering and science curricula; guest speakers in college, secondary, and elementary classrooms; educational outreach activities designed to stimulate interest in science, mathematics and technology in grades K-12; and increased awareness of aerospace advances among the general public.

Successes in recruiting and training women, underrepresented minorities, and persons with disabilities are seen through recruiting and establishing both Nebraska tribal colleges as affiliates; hosting a grant proposal workshop for the tribes which, in turn, resulted in funded education and research proposals; advertisement of awards through minority student agencies on campuses; underrepresented student fellowships for new and transfer students. The NASA Nebraska Space Grant also has selected a SHARP Alum, now on the faculty at UN-L, to receive research enhancement funding for a project which will allow Center collaborations.

The focus of Nebraska Space Grant education programs is now centered on higher education. The increasing number of higher education programs (see Table 7) is impacting more students and faculty statewide. However, the amount of NASA funds required has declined, a direct result of 'doing more with less.' Projects are funded which are proven to be effective and Space Grant support is generally supplemental. This mutually-beneficial relationship allows the Space Grant more visibility for less cost, yet also benefits more programs that are now connected to the NASA Space Grant. Additionally, the new approach has resulted in increased matching funds.

Table 7. Higher Education Programs of the NASA Nebraska Space Grant

	1995	1997
Higher education programs	6	9
Participants	587	6,520
NASA funds	\$6,950.00	\$2,650.00
Matching funds	\$11,100.00	\$16,750.00

Space Grant programs support the systemic reform initiatives in Nebraska. The Nebraska Space Grant is synergistically linked in all aspects to the overall systemic/strategic plan for the Lead Institution, the Department of Aeronautics, and ultimately to the state strategic plan. Nebraska involvement with the Aerospace States Association assists in this area, as does our affiliation with the Nebraska Math & Science Initiative.

The Consortium for the Application of Space Data to Education (CASDE) at UN-L and the College of Education at UNO collaborate on a project entitled Virtual Nebraska. This program,

related to cooperative extension, promotes the use of space-derived, remotely-sensed data and information. Focused on K-12 education, CASDE has accepted the challenge to help make such data easily and intuitively available to teachers. Through forming 'curricular partnerships,' the program matches the needs of educators with the data and tools of engineers and scientists. The goal is to integrate these data and tools into the educational process, as well as to provide easy access and appropriate technical assistance.

Initial collaborations in best practices with the Minnesota Sea Grant are ongoing. This effort involves joint activities in research and outreach with the Sea Grant "Water on the Web" project. Three collaborative visits have resulted.

The NSGC has been instrumental in supporting guest lectures that provide seminars for faculty development at the post-secondary level. Recent guest speakers include NASA Administrator Daniel Goldin; remote sensing colleague Anatoly Gittelsohn, Ben-Gurion University, Israel; NASA Lewis colleague Daniel L. Dietrich; former NASA astronaut Wally Schirra; College of Education guest speaker Charles Anderson, NASA Johnson Space Center; and former NASA astronaut 'Hoot' Gibson; among others.

Table 8 illustrates the pre-college education funding and outcomes for 1995 and 1997. Future plans for education outreach include distance education at both the higher education and K-12 levels, continued Sea Grant progress in "Water on the Web" outreach, continued development of Nebraska's library resources, teacher training, underrepresented minority initiatives, and a focus on bringing research into the classroom.

Table 8. Pre-college Education Programs of the NASA Nebraska Space Grant

	1995	1997
Pre-college programs	3	5
Participants	4,852	27,106
NASA funds	\$4,000.00	\$7,625.00
Matching funds	\$13,200.00	\$18,845.00

## Public Service

### Fair Distribution of Consortium Funds to Member Institutions

As public service programs are generally unknown one year in advance, the NASA Nebraska Space Grant receives proposals year-round for valuable programs. Funding is determined through priorities to NASA. For example, the opportunity to have Dan Goldin visit the campus and address the UNO graduates at commencement in August 1997 was a valuable experience for the Nebraska Space Grant. Opportunities such as these are considered as they are proposed, and attempts are made to be fair in distributing funds for external relations. Specifically, efforts to include and promote public service activities which target underrepresented groups are a priority for the Space Grant. Table 7 highlights the increase in general public awareness about the Nebraska Space Grant.

Table 9. General Public and External Relations of the NASA Nebraska Space Grant

	1995	1997
General public & external relations programs	5	16
Participants	6,880	1,894,140
NASA funds	\$3,700.00	\$8,450.00
Matching funds	\$12,600.00	\$41,800.00

### Conclusion

A focus group was conducted at the fall 1998 advisory board meeting. Members participated in an exercise to identify strengths and weaknesses of the Nebraska Space Grant Consortium. This activity provided further discussion for the members to plan strategies to overcome the weaknesses. The top three strengths of the NASA Nebraska Space Grant Consortium are:

- Fair distribution of funds among member institutions;
- Statewide visibility of the national program and consortium activities; and
- Regularly scheduled annual meetings with advisory group.

The top three weaknesses and board recommended strategies to overcome these include:

- Strives to recruit graduates of NASA pre-college programs and Center-initiated undergraduate programs to the Space Grant scholarship program.  
Recommendations to overcome this weakness area:
  - Later at the same meeting, a SHARP alum was selected to receive research enhancement funding.
  - Contact has been established with the NEWEST and NEWMAST programs to receive contact information for Nebraska alums.
  - Nebraska Space Grant promotes and recruits NASA Academy applicants. Scholarship funds are reserved for two Academy students each year.
  - Nebraska Space Grant supports the Dryden Aeronautics Academy through the Aeronautics/Aero-Space Enterprise Working Group.
  - As the Space Grant strives to be the NASA point of contact in the state, better communication between NASA, Space Grant, and attendees/alums will result.
- Maintains regular ties with aero-space related industry.  
The NASA Nebraska Space Grant advisory board provided the following recommendations to better facilitate collaborations with industry:
  - A former Space Grant, now NASA EPSCoR, researcher received a Nebraska Research Initiative grant to develop industry relations in the area of GIS.
  - Identification of key aero-space related industry in Nebraska.
  - The Aerospace States Association (ASA) recently provided a list of 21 industries in Nebraska associated with the aerospace industry. The former Nebraska delegate will forward this list. Space Grant Director Brent Bowen has been appointed as the new delegate by the governor.
  - Connectivity with the new UNO College of Information Science and Technology.

- Works with NASA Centers and business and industry to develop and transfer NASA-related technology from Space Grant-funded research to the commercial sector. The NASA Nebraska Space Grant advisory board provided the following recommendations to better facilitate collaborations:
  - Researchers in the past have been intimidated to visit the Centers and establish research collaborations. Therefore, the board recommends bringing NASA representatives to Nebraska. UAOs and NASA researchers alike can be supported through travel grant funds to visit Nebraska. This experience would benefit students, faculty, and the Nebraska general public. Research symposia, course lectures, and general public talks could be planned for these visits.
  - Technology transfer to the commercial sector is also a priority of NASA EPSCoR.
  - A new technology transfer center has been established for the University of Nebraska system. Establishing ties with this center will be a priority for Space Grant and EPSCoR.

Other questions addressed by the advisory board included:

- How can the NASA Nebraska Space Grant Consortium establish working relationships with Land Grant extensions (i.e. a cooperative extension component for Space Grant)?
  - Attempt collaborations with Land Grant similar to Sea Grant 'Water on the Web'.
  - Dr. Donald Rundquist suggested IANR has cooperative extension tie and they are working on a new prototype project which may have Space Grant connections.
  - One consideration for the future is long-distance learning with Land Grant and agriculture through remote sensing.
  - Space Grant brochures available through the network of cooperative extension.
  - A visit to the local network office would also provide additional leads. There used to be one in each state, but they have since consolidated.
  - Consider a fellowship to the Cooperative Extension office for research and education projects.
- How can the NASA Nebraska Space Grant Consortium encourage our researchers to establish collaborations with NASA Centers and NASA researchers?
  - It was suggested there is an intimidation factor; faculty members are intimidated to approach NASA. Consider bringing NASA representatives for symposia here at UNO and UNL.
  - Field trip for Nebraska delegation to NASA center with travel grant funds.
  - Locate Nebraska alums at the Centers that can host our researchers.

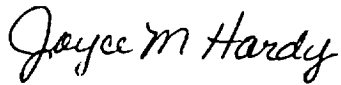
Overall, this process was both time and labor intensive to better prepare the consortium for the next century. The NASA Nebraska Space Grant will continue to meet NASA's goals in Nebraska through exceptional research, education, and outreach activities.

## Summary

- Nebraska is CMIS compliant and responsive to NASA Headquarters.
- 13 academic affiliates, including two tribal colleges and one all-women's college.
- Active advisory board with one meeting per year. All affiliates have representation.
- Always meets NASA deadlines and responds to requests for information and input.
- Collaboratively written self-evaluation approved by the advisory board and all affiliates.
- Nebraska's NASA collaborations increased almost 400 percent.
- Nebraska met *every* guideline presented in the Goldin challenge for both 1997 and 1998.
- Include underrepresented groups in all program aspects.
- Nebraska is active at the state, regional, and national levels of Space Grant.
- Excellent collaborations between Space Grant research and UNO College of Education.
- Provide briefings to key Nebraska leaders, including governor's office and congressmen.
- Strategic planning practices in place with strategic plan developed in February 1996.
- Teacher training focus in education programs, especially through UNO College of Education.
- Grant proposal workshop for Nebraska Indian reservations.
- Annual research conference allows student and faculty researchers to present findings.
- Grievance procedures adopted in 1996.
- Annual statewide competition for research infrastructure, education outreach, and fellowship funds, open to all member institutions.
- Relayed the importance of timely costing of consortium funds to all affiliates.
- Management costs and staff levels remain at an appropriate level.
- Resources have been directed toward distance learning initiatives.
- Strives to maintain high visibility of NASA in Nebraska.
- Web page is updated frequently and includes all application forms and information.
- Students are involved in research with faculty mentors.
- Each academic affiliate is awarded scholarships.
- Sea and Land Grant collaborations.
- NASA Center and NASA program collaborations.
- Successful relationships with state government.
- Increasing number of higher education programs for less NASA investment.
- Supports systemic reform initiatives in Nebraska.
- Strives to be a model Space Grant capability enhancement consortium.

**Affiliate Concurrence**

We, the Academic Affiliate Representatives, have reviewed, contributed to, and concur with the 1999 NASA Nebraska Space Grant Consortium Self-Evaluation.



Chadron State College



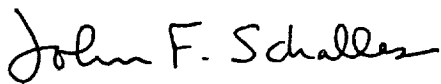
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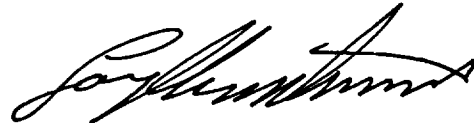
College of St. Mary



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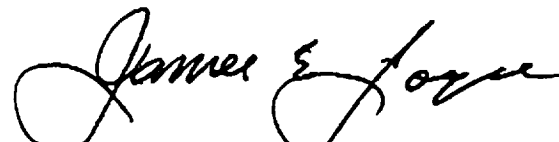
Hastings College



University of Nebraska Medical Center



Little Priest Tribal College



Western Nebraska Community College



Metropolitan Community College

# REPORT DOCUMENTATION PAGE

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